

Report on CLEF 2019

Martin Braschler
Zurich University of Applied Sciences (ZHAW), Switzerland
bram@zhaw.ch

Linda Cappellato
University of Padua, Italy
cappellato@dei.unipd.it

Fabio Crestani
Università della Svizzera italiana (USI), Switzerland
fabio.crestani@usi.ch

Nicola Ferro
University of Padua, Italy
ferro@dei.unipd.it

Gundula Heinatz Bürki
Swiss Alliance for Data-Intensive Services, Switzerland
gundula.heinatz@data-service-alliance.ch

David E. Losada
University of Santiago de Compostela, Spain
david.losada@usc.es

Henning Müller
University of Applied Sciences Western Switzerland (HES-SO), Switzerland
henning.mueller@hevs.ch

Andreas Rauber
Vienna University of Technology (TU Wien), Austria
rauber@ifs.tuwien.ac.at

Jacques Savoy
Université de Neuchâtel, Switzerland
jacques.savoy@unine.ch

Abstract

This is a report on the tenth edition of the *Conference and Labs of the Evaluation Forum* (CLEF 2019), held from September 9–12, 2019, in Lugano, Switzerland.

CLEF was a four day event combining a Conference and an Evaluation Forum. The Conference featured keynotes by Bruce Croft, Yair Neuman, and Miguel Martínez, and presentation of peer reviewed research papers covering a wide range of topics in addition to many posters. The Evaluation Forum consisted of nine Labs: CENTRE, CheckThat, eHealth, eRisk, ImageCLEF, LifeCLEF, PAN, PIR-CLEF, and ProtestNews, addressing a wide range of tasks, media, languages, and ways to go beyond standard test collections.

CLEF 2019 marked the 20th anniversary of CLEF, which was celebrated with a dedicated session and a book on the lessons learnt in twenty years of evaluation activities and the future perspectives for CLEF.

CLEF 2019 also introduced the Industry Days to further extend the reach and impact of CLEF.

1 Introduction

The 2019 edition of the *Conference and Labs of the Evaluation Forum*¹ (CLEF) was organized and hosted by the Università della Svizzera italiana (USI) from the 9th to 12th September 2019.

CLEF was established as a spin-off of the TREC Cross-Language Track with a focus on stimulating research and innovation in multimodal and multilingual information access and retrieval. The first evaluation cycle ran in 2000. Over the years CLEF has fostered the creation of language resources in many European and non-European languages, promoted the growth of a vibrant and multidisciplinary research community, provided sizable improvements in the performance of monolingual, bilingual, and multilingual information access systems [8], and achieved a substantial scholarly impact [13, 16, 17].

In its first 10 years, CLEF hosted a series of experimental labs that reported their results at an annual workshop held in conjunction with the European Conference on Digital Libraries (ECDL). In 2010, now a mature and well-respected evaluation forum, CLEF expanded to include a complementary peer-reviewed conference for discussion of advancing evaluation methodologies and reporting the evaluation of information access and retrieval systems regardless of data type, format, language, etc. Moreover, the scope of the evaluation labs was broadened, to comprise not only multilinguality but also multimodality in information access. Multimodality here is intended not only as the ability to deal with information coming in multiple media but also in different modalities, e.g. the Web, social media, news streams, specific domains and so on. Since 2010 the CLEF conference has established a format with keynotes, contributed papers, lab sessions, and poster sessions, including reports from other benchmarking initiatives from around the world. Since 2013, CLEF has been supported by an association, a lightweight not-for-profit legal entity that thanks to the financial support of the CLEF community takes care of the small central coordination needed to operate CLEF on an ongoing basis and makes it a self-sustaining activity [5].

CLEF 2019 marked a special edition since it is the 20th anniversary of CLEF (it was established in 2000). We celebrated this event by organizing a session devoted to the past and, especially, the

¹<http://clef2019.clef-initiative.eu/>

future of CLEF. We also prepared a book [7] focusing on the lessons learnt in 20 years of CLEF and its impact over time.

CLEF 2019 introduced several novelties. First, we set up a *mentorship program* to support the preparation of lab proposals for newcomers to CLEF. The CLEF newcomers mentoring program offered help, guidance, and feedback on the writing of draft lab proposals by assigning a mentor to proponents, who helped them in preparing and maturing the lab proposal for submission. If the lab proposal fell into the scope of an already existing CLEF lab, the mentor helped proponents to get in touch with the lab organizers and team up forces.

Second, CLEF 2019 hosted an *Industry Day* for the first time, jointly organized with the Swiss Alliance for Data-Intensive Services. The goal was to further open CLEF to a wider, industrial community through demo sessions, panels and special keynotes where the best and most pertinent work of CLEF participants would be made publicly visible.

Lastly, for the first time, the *European Conference for Information Retrieval (ECIR)* and CLEF joined forces: ECIR 2019 hosted a special session dedicated to CLEF Labs where lab organizers presented the major outcomes of their labs and their plans for ongoing activities, followed by a poster session to favour discussion during the conference. This was reflected in the ECIR 2019 proceedings, where CLEF Lab activities and results were reported as short papers. The goal was not only to engage the ECIR community in CLEF activities but also to disseminate the research results achieved during CLEF evaluation cycles as submission of papers to ECIR.

CLEF 2019 was attended by 162 participants out of which 72 (57%) were students from different academic institutions, denoting a young and vibrant community. Also, because of its special industry track, 12% of the participants were from industry, contributing to widen the discussion towards more applied methodologies. Although the majority (75%) of the participants came from different European countries and Russia, there was also considerable interest in CLEF worldwide, with about 10% participants from the Americas, 14% from Asia and Australia, and even 0.5% (well, just one participant!) from Africa. Finally, thanks to the SIGIR Friends program, 6 students received a grant that covered conference fees, while other 8 students received it from the organising committee as student helpers (i.e. by helping the organising and running of the event).

2 The CLEF Conference

CLEF 2019 continued the focus of the CLEF conference on “experimental IR” as carried out at evaluation forums (CLEF Labs, TREC, NTCIR, FIRE, MediaEval, RomIP, TAC, ...) with special attention to the challenges of multimodality, multilinguality, and interactive search. We invited submissions on significant new insights demonstrated on the resulting IR test collections, on analysis of IR test collections and evaluation measures, as well as on concrete proposals to push the boundaries of the Cranfield/TREC/CLEF paradigm [2].

Keynotes The following scholars were invited to give a keynote talk at the CLEF 2019 conference.

W. Bruce Croft (University of Massachusetts at Amherst, USA) delivered a talk entitled “The Relevance of Answers” which focused on information retrieval tasks that involve retrieving answers

rather than documents in response to users' questions with the aim of identifying some of the key aspects of answers that should be studied to support the ongoing development of more effective search systems.

Yair Neuman (Ben-Gurion University of the Negev, Israel) gave a speech on “Automatic Analysis of Personality Dimensions through Digital Signatures: Vision, Achievements and Challenges”, presenting the vision of computational personality analysis and its relevance for current challenges in various fields, including a critical examination of some ventures, such as those developed by IBM Personality Insights and the late Cambridge Analytica, and finally pointing to the challenges facing those who are interested in advancing the field.

CLEF 20th Anniversary Celebration To celebrate the 20th anniversary of CLEF, a dedicated session was organized consisting of a panel and open discussions on the past and future of CLEF.

Nicola Ferro (University of Padua, Italy) provided an overview of 20 years of CLEF and its main achievements. *Martin Braschler* (ZHAW, Switzerland) discussed the founding and early days of CLEF. *Donna Harman* (NIST, USA) talked about the importance of shared evaluation initiatives. *Douglas W. Oard* (University of Maryland, USA) reasoned about the evolution of shared-tasks evaluation campaigns. *W. Bruce Croft* (University of Massachusetts at Amherst, USA) discussed about CLEF from an outside perspective. Finally, *Alba García Seco de Herrera* (University of Essex, UK) went through her personal experience to explain how CLEF can accompany the evolution of a career from the PhD onward.

Other Evaluation Initiatives *Donna Harman* (NIST, USA) introduced TREC² (Text REtrieval Conference) of which the purpose is to support research within the information retrieval community by providing the infrastructure necessary for large-scale evaluation of text retrieval methodologies. *Noriko Kando* (NII, Japan) presented NTCIR³ (NII Testbeds and Community for Information access Research), which promotes research in information access technologies with a special focus on East Asian languages and English. *Gareth Jones* (Dublin City University, Ireland) presented MediaEval⁴, the benchmarking initiative for multimedia evaluation, including speech, audio, visual content, tags, users, and context.

In Memoriam of Séamus Lawless This 20th anniversary was not only an opportunity to celebrate the achievements of CLEF but also, sadly, an occasion for remembering friends and colleagues who greatly contributed to what CLEF is today and inspired all of us.

Very recently, Séamus Lawless, Trinity College Dublin, Ireland, fell during a descent of Mount Everest, after having achieved his dream of reaching the peak. Séamus, member of the CLEF Steering Committee, greatly contributed to CLEF with his research talent and generosity of spirit by opening new research collaborations with the adaptivity and personalisation communities.

Gareth Jones, Dublin City University, Ireland, gave a speech in memoriam of Séamus.

Technical Program CLEF 2019 received a total of 29 submissions, of which a total of 15 papers (7 long, 8 short) were accepted. Each submission was reviewed by three program committee

²<https://trec.nist.gov/>

³<http://research.nii.ac.jp/ntcir/>

⁴<http://multimediaeval.org/>

members, and the program chairs oversaw the reviewing and follow-up discussions. Thirteen countries are represented in the accepted papers. This year, many contributions tackled social networks with the detection of stances or early identification of depression signs on Twitter in a cross-lingual context. Web data is also analyzed in an information diffusion perspective as to discover the main factors explaining a higher probability of being retweeted. More directly related to information retrieval, one study investigates the challenge of tuning parameters for different collections and another analyzes how kids would use a vocal assistant for performing a search task.

Like in previous editions since 2015, CLEF 2019 continued inviting CLEF lab organizers to nominate a “best of the labs” paper that was reviewed as a full paper submission to the CLEF 2019 conference according to the same review criteria and PC. Seven full papers were accepted for this “best of the labs” section.

Social Program The picturesque lakeside city of *Lugano* is famous for its beautiful quasi-Mediterranean climate and is a popular destination for its lovely scenery and its laid back lifestyle. The conference dinner, on the second evening of the conference, enabled the participants to enjoy the scenery from Monte San Salvatore, on the lake shore just opposite to Lugano, dining and drinking in good company. The first evening was devoted to welcoming CLEF participants to the conference, with a reception at the Università della Svizzera Italiana (USI) which hosted CLEF. The third evening, on the other hand, saw academic and industry participants happily getting to know each other over an aperitif at the Villa Ciani, right in the centre of Lugano, in the lovely Parco Ciani.

3 The CLEF Industry Days

The Industry Days were designed to allow the interaction between the scientific community, practitioners and decision-makers, as well as encourage technology transfer between these different actors.

First Day Spread over two days, the Industry Days were started with a panel of experts both from academia and industry discussing the topic “Data Science in Europe”. The panelists were *Gareth Jones* (Dublin City University) and *Douglas W. Oard* (University of Maryland) as representatives of the academic CLEF community, originating both from within Europe and from the United States; *Kornelia Papp* (Swiss Re) and *Dorian Selz* (Squirro AG) as representatives of the industry side, the former from a large enterprise and the latter from a technology start-up; and last but not least, *Reinhard Riedl* (Berne University of Applied Sciences) representing the view of a funding agency in his role as member of the steering committee of a large Big Data funding initiative by the Swiss National Science Foundation.

The spirited discussion kicked off with the question of how practitioners find value in the output of CLEF: how to set up effective communication and engage the right actors. It then evolved to questions on how to benefit from collaboration as an academic: what instruments are available for engagement and how can academic research be positively influenced by it? How can Europe position itself in the best way to foster the technology transfer and compete with the initiatives

in North America and Asia? After an initial round among the panelists, the debate was opened for the audience.

The remainder of the first day was used for talks by industry representatives that presented some of the challenges they faced when operationalizing research in the fields covered by CLEF. *Mark Cieliebak* (SpinningBytes) explained an iterative process for document classification in production. The main challenges lie in getting appropriate training data and gaining domain specific knowledge. *Silvio Arcangeli* (SAP) addressed some of the key challenges in data management by showing industry examples from an insurance company. *Jussi Kalgren* (Gavagai) discussed the hindrances for adapting systematic evaluation benchmarks in practice.

From these talks, a common theme of balancing theory with operational concerns emerged: issues such as scaling approaches to large amounts of data and of venturing beyond laboratory settings were discussed. The day ended with a reception by the lakeside.

Second Day The second half of the Industry Days kicked off with a keynote by *Miguel Martínez* (Signal AI) on “Analysing the world’s news: Learnings and challenges from industry”, discussing the efforts to transfer the best research in IR/NLP to build a large-scale text analytics pipeline capable of processing millions of documents daily. This pipeline powers the Signal AI media monitoring and intelligence platform. Importantly, the talk reviewed some of the open challenges that could be interesting for the CLEF community.

Following the keynote, lab organizers discussed the past work of their labs in the context of their potential for industry pick-up. After lunch, the Industry Days were rounded out with a set of talks by industry participants, talking about different application domains such as the insurance and tourism industries.

José Iria (La Mobilière) presented data-centric products and services in life insurance, as well as the analysis of disability claims by using a text mining pipeline. *Alireza Ghasemi* (ELCA) addressed the typical challenges faced when working on insight extraction from unstructured data in companies. *Christoph Glauser* (ArgYou) presented a system for market analysis of the Jungfrau tourism region that integrates information from search engines, social media platforms and international websites.

4 The CLEF Lab Sessions

Nine laboratories were selected and ran during CLEF 2019. To identify the best proposals, well established criteria from previous editions of CLEF were applied like, for example, topical relevance, novelty, potential impact on future world affairs, likely number of participants, and the quality of the organizing consortium. This year we further stressed the connection to real-life usage scenarios and we tried to avoid as much as possible overlaps among labs in order to promote synergies and integration.

The labs at CLEF 2019, building on previous experience, demonstrate the maturity of the CLEF evaluation environment via the incorporation of new tasks, new and larger data sets, new ways of evaluation or more languages. Details of the individual labs are described by the lab

organizers in the CLEF Working Notes [1]. We only provide a brief overview of them here.

CLEF/NTCIR/TREC Reproducibility – CENTRE@CLEF⁵ aims to run a joint CLEF/NTCIR/TREC task on challenging participants: 1) to reproduce best results of best/most interesting systems in previous editions of CLEF/NTCIR/TREC by using standard open source IR systems; 2) to contribute back to the community the additional components and resources developed to reproduce the results in order to improve existing open source systems [6].

Identification and Verification of Political Claims – CheckThat!⁶ aims to foster the development of technology capable of both spotting and verifying check-worthy claims in political debates in English and Arabic [4].

CLEF eHealth⁷ aims to support the development of techniques to aid laypeople, clinicians and policy-makers in easily retrieving and making sense of medical content to support their decision making. The goals of the lab are to develop processing methods and resources in a multilingual setting to enrich difficult-to-understand eHealth texts and provide valuable documentation [12].

Early Risk Prediction on the Internet – eRisk⁸ explores challenges of evaluation methodology, effectiveness metrics and other processes related to early risk detection. Early detection technologies can be employed in different areas, particularly those related to health and safety. For instance, early alerts could be sent when a predator starts interacting with a child with sexual intentions, or when a potential offender starts publishing antisocial threats on a blog, forum or social network. The main goal is to pioneer a new interdisciplinary research area that would be potentially applicable to a wide variety of situations and to many different personal profiles [14].

Multimedia Retrieval – ImageCLEF⁹ provides an evaluation forum for visual media analysis, indexing, classification/learning, and retrieval in medical, nature, security and lifelogging applications with a focus on multimodal data, so data from a variety of sources and media [10].

Biodiversity Identification and Prediction – LifeCLEF¹⁰ aims at boosting research on the identification and prediction of living organisms to solve the taxonomic gap and improve our knowledge of biodiversity. Through its biodiversity informatics related challenges, LifeCLEF intends to push the boundaries of the state-of-the-art in several research directions at the frontier of multimedia information retrieval, machine learning and knowledge engineering [11].

Digital Text Forensics and Stylometry – PAN¹¹ is a networking initiative for the digital text forensics, where researchers and practitioners study technologies that analyze texts with regard to originality, authorship, and trustworthiness. PAN provides evaluation resources consisting of large-scale corpora, performance measures, and web services that allow for meaningful evaluations. The main goal is to provide for sustainable and reproducible evaluations, to get a clear

⁵<http://www.centre-eval.org/clef2019/>

⁶<https://sites.google.com/view/clef2019-checkthat/>

⁷<http://clef-ehealth.org/>

⁸<http://erisk.irlab.org/>

⁹<https://www.imageclef.org/2019>

¹⁰<http://www.lifeclef.org/>

¹¹<http://pan.webis.de/>

view of the capabilities of state-of-the-art-algorithms [3].

Personalised Information Retrieval – PIR-CLEF¹² provides a framework for the evaluation of Personalised Information Retrieval (PIR). Current approaches to the evaluation of PIR are user-centric, mostly based on user studies, i.e., they rely on experiments that involve real users in a supervised environment. PIR-CLEF aims to develop and demonstrate a methodology for the evaluation of personalised search that enables reproducible experiments. The main aim is to enable research groups working on PIR to both experiment with and provision of feedback on the proposed PIR evaluation methodology [15].

Extracting Protests from News – ProtestNews¹³ aims to test and improve state-of-the-art generalizable machine learning and natural language processing methods for text classification and information extraction on English news from multiple countries such as India and China for creating comparative databases of contentious politics events (riots, social movements), i.e. the repertoire of contention that can enable large scale comparative social and political science studies [9].

More information on the CLEF 2019 conference, the CLEF initiative and the CLEF Association is provided on the Web:

- CLEF 2019: <http://clef2019.clef-initiative.eu/>
- CLEF initiative: <http://www.clef-initiative.eu/>
- CLEF Association: <http://www.clef-initiative.eu/association>

5 CLEF 2020 and Beyond

CLEF 2020 will be hosted at the Centre for Research & Technology Hellas (CERTH), Thessaloniki, Greece, September 22–25, 2020.

More information on CLEF 2020, the call for papers and the ongoing labs are available at:

- <https://clef2020.clef-initiative.eu/>

As far as labs are concerned, CLEF 2020 will run 12 evaluation activities out of 15 proposals received: 6 will be a continuation of the labs running during CLEF 2018 and 6 will be new pilot labs.

The continued activities are:

- CheckThat!: Automatic Identification and Verification of Claims (<https://sites.google.com/view/clef2020-checkthat>);
- eHealth: Retrieving and Making Sense of Medical Content (<http://clef-ehealth.org/>);
- eRisk: Early Risk Prediction on the Internet (<http://early.irlab.org/>);

¹²<http://www.ir.disco.unimib.it/pir-clef2019/>

¹³<https://emw.ku.edu.tr/clef-protestnews-2019/>

-
- ImageCLEF: Multimedia Retrieval in Medicine, Lifelogging, and Internet (<https://www.imageclef.org/2020>);
 - LifeCLEF: Multimedia Retrieval in Nature (<https://www.imageclef.org/LifeCLEF2020>);
 - PAN: Stylometry and Digital Text Forensics (<https://pan.webis.de/>).

The new activities are:

- ARQMath: Answer Retrieval for Questions on Math (<https://www.cs.rit.edu/~dprl/ARQMath/>);
- BioASQ: Large-scale Biomedical Semantic Indexing and Question Answering (<http://www.bioasq.org/workshop2020>);
- ChEMU: Named Entity Recognition and Event Extraction of Chemical Reactions from Patents (<http://chemu.github.io/>);
- HIPE: Identifying Historical People, Places and other Entities (<https://impresso.github.io/CLEF-HIPE-2020/>);
- LiLAS: Living Labs for Academic Search (<https://clef-lilas.github.io/>);
- Touché: Argument Retrieval (<http://touche.webis.de/>).

CLEF 2021 will be hosted by University Politehnica of Bucharest, Romania, in early September 2021.

CLEF 2022 will be hosted by University of Bologna, Italy, in early September 2022.

Finally, bids for hosting CLEF 2023 are now open and will close around July 2020. Proposals can be sent to the CLEF Steering Committee Chair at chair@clef-initiative.eu.

Acknowledgments

The success of CLEF 2019 would not have been possible without the huge effort of several people and organizations, including the CLEF Association¹⁴, the program committee, the lab organizing committee, the local organization committee in Lugano, the reviewers, and the many students and volunteers who contributed along the way.

We gratefully acknowledge the support we received from our sponsors: ACM SIGIR¹⁵, the Swiss Alliance for Data-Intensive Services¹⁶, the Swiss Innovation Agency¹⁷, and the Swiss National Science Foundation¹⁸.

¹⁴<http://www.clef-initiative.eu/association>

¹⁵<http://sigir.org/>

¹⁶<https://data-service-alliance.ch/>

¹⁷<https://www.innosuisse.ch/inno/en/home.html>

¹⁸<http://www.snf.ch/en/>

Last but not least without the important and tireless effort of the enthusiastic and creative authors, the organizers of the selected labs, the colleagues and friends involved in running them, and the participants who contribute their time to making the labs and the conference a success, as well as financially supporting them through the CLEF Association, CLEF would not be possible.

Thank you all very much!

References

- [1] L. Cappellato, N. Ferro, D. E. Losada, and H. Müller, editors. *CLEF 2019 Working Notes*. CEUR Workshop Proceedings (CEUR-WS.org), ISSN 1613-0073, <http://ceur-ws.org/Vol-2380/>, 2019.
- [2] F. Crestani, M. Braschler, J. Savoy, A. Rauber, H. Müller, D. E. Losada, G. Heinatz Bürki, L. Cappellato, and N. Ferro, editors. *Experimental IR Meets Multilinguality, Multimodality, and Interaction. Proceedings of the Tenth International Conference of the CLEF Association (CLEF 2019)*. Lecture Notes in Computer Science (LNCS) 11696, Springer, Heidelberg, Germany, 2019.
- [3] W. Daelemans, M. Kestemont, E. Manjavacas, M. Potthast, F. M. Rangel Pardo, P. Rosso, G. Specht, E. Stamatatos, B. Stein, M. Tschuggnall, M. Wiegmann, and E. Zangerle. Overview of PAN 2019: Bots and Gender Profiling, Celebrity Profiling, Cross-domain Authorship Attribution and Style Change Detection. In Crestani et al. [2], pages 402–416.
- [4] T. Elsayed, P. Nakov, A. Barrón-Cedeño, M. Hasanain, R. Suwaileh, G. Da San Martino, and P. Atanasova. Overview of the CLEF-2019 CheckThat!: Automatic Identification and Verification of Claims. In Crestani et al. [2], pages 301–321.
- [5] N. Ferro. What Happened in CLEF... For a While? In Crestani et al. [2], pages 3–45.
- [6] N. Ferro, N. Fuhr, M. Maistro, T. Sakai, and I. Soboroff. Overview of CENTRE@CLEF 2019: Sequel in the Systematic Reproducibility Realm. In Crestani et al. [2], pages 287–300.
- [7] N. Ferro and C. Peters, editors. *Information Retrieval Evaluation in a Changing World – Lessons Learned from 20 Years of CLEF*, volume 41 of *The Information Retrieval Series*. Springer International Publishing, Germany, 2019.
- [8] N. Ferro and G. Silvello. 3.5K runs, 5K topics, 3M assessments and 70M measures: What trends in 10 years of Adhoc-ish CLEF? *Information Processing & Management*, 53(1):175–202, January 2017.
- [9] A. Hürriyetoglu, E. Yörük, D. Yuret, Ç. Yoltar, B. Gürel, F. Duruşan, O. Mutlu, and A. Akdemir. Overview of CLEF 2019 Lab ProtestNews: Extracting Protests from News in a Cross-context Setting. In Crestani et al. [2], pages 425–432.
- [10] B. Ionescu, H. Müller, R. Péteri, Y. Dicente Cid, V. Liauchuk, V. Kovalev, D. Klimuk, A. Tarasau, A. Ben Abacha, S. A. Hasan, V. Datla, J. Liu, D. Demner-Fushman, D.-T. Dang-Nguyen, L. Piras, M. Riegler, M.-T. Tran, M. Lux, C. Gurrin, O. Pelka, C. M.

-
- Friedrich, A. Garcia Seco de Herrera, N. Garcia, E. Kavallieratou, C. R. del Blanco, C. Cuevas Rodríguez, N. Vasillopoulos, K. Karampidis, J. Chamberlain, A. Clark, and A. Campello. ImageCLEF 2019: Multimedia Retrieval in Medicine, Lifelogging, Security and Nature. In Crestani et al. [2], pages 358–386.
- [11] A. Joly, H. Goëau, C. Botella, S. Kahl, M. Servajean, H. Glotin, P. Bonnet, W.-P. Vellinga, R. Planqué, F.-R. Stöter, and H. Müller. Overview of LifeCLEF 2019: Identification of Amazonian Plants, South & North American Birds, and Niche Prediction. In Crestani et al. [2], pages 387–401.
- [12] L. Kelly, H. Suominen, L. Goeuriot, M. Neves, E. Kanoulas, D. Li, L. Azzopardi, R. Spijker, G. Zuccon, H. Scells, and J. Palotti. Overview of the CLEF eHealth Evaluation Lab 2019. In Crestani et al. [2], pages 322–339.
- [13] B. Larsen. The Scholarly Impact of CLEF 2010-2017. In Ferro and Peters [7], pages 547–554.
- [14] D. E. Losada, F. Crestani, and J. Parapar. Overview of eRisk 2019: Early Risk Prediction on the Internet. In Crestani et al. [2], pages 340–357.
- [15] G. Pasi, G. J. F. Jones, L. Goeuriot, L. Kelly, S. Marrara, and C. Sanvitto. Overview of the CLEF 2019 Personalised Information Retrieval Lab (PIR-CLEF 2019). In Crestani et al. [2], pages 417–424.
- [16] T. Tsikrika, A. Garcia Seco de Herrera, and H. Müller. Assessing the Scholarly Impact of ImageCLEF. In P. Forner, J. Gonzalo, J. Kekäläinen, M. Lalmas, and M. de Rijke, editors, *Multilingual and Multimodal Information Access Evaluation. Proceedings of the Second International Conference of the Cross-Language Evaluation Forum (CLEF 2011)*, pages 95–106. Lecture Notes in Computer Science (LNCS) 6941, Springer, Heidelberg, Germany, 2011.
- [17] T. Tsikrika, B. Larsen, H. Müller, S. Endrullis, and E. Rahm. The Scholarly Impact of CLEF (2000–2009). In P. Forner, H. Müller, R. Paredes, P. Rosso, and B. Stein, editors, *Information Access Evaluation meets Multilinguality, Multimodality, and Visualization. Proceedings of the Fourth International Conference of the CLEF Initiative (CLEF 2013)*, pages 1–12. Lecture Notes in Computer Science (LNCS) 8138, Springer, Heidelberg, Germany, 2013.